

What is claimed is:

1 1. An apparatus for removing metal from a wafer
2 edge, comprising:

3 a bath tank for containing a chemical bath;

4 a rotatable wafer chuck for holding a wafer vertical

5 to the chemical bath, wherein at least the edge

6 of the wafer is covered with a metal layer; and

7 a sliding element disposed on one end of the

8 rotatable wafer chuck such that the rotatable

9 wafer chuck can move in a vertical direction to

10 the chemical bath.

1 2. The apparatus as claimed in claim 1, further
2 comprising a front suppression line disposed
3 substantially in front of the wafer and near the surface
4 of the chemical bath to provide a first flow for
5 suppressing the chemical bath from splashing the wafer.

1 3. The apparatus as claimed in claim 2, wherein
2 the first flow comprises an inert gas with a flow rate
3 between 5~100 sccm.

1 4. The apparatus as claimed in claim 1, further
2 comprising a front rinse line disposed in front of the
3 wafer to provide a rinse fluid for cleaning the front
4 wafer surface.

1 5. The apparatus as claimed in claim 4, wherein
2 the flow rate of the rinse fluid is between 500~30000
3 ml/min.

1 6. The apparatus as claimed in claim 2, further
2 comprising a front rinse line disposed in front of the
3 wafer and in a position closer to the wafer center than
4 the front suppression line to provide rinse fluid for
5 cleaning the front wafer surface.

1 7. The apparatus as claimed in claim 6, wherein
2 the flow rate of the rinse fluid is between 500~30000
3 ml/min.

1 8. The apparatus as claimed in claim 1, further
2 comprising a rear suppression line disposed substantially
3 behind the wafer and near the surface of the chemical
4 bath to provide a second flow for suppressing the
5 chemical bath from splashing the wafer.

1 9. The apparatus as claimed in claim 8, wherein
2 the second flow comprises an inert gas with a flow rate
3 between 5~100 sccm.

1 10. The apparatus as claimed in claim 1, further
2 comprising a rear rinse line disposed behind the wafer to
3 provide a rinse fluid for cleaning the rear wafer
4 surface.

1 11. The apparatus as claimed in claim 10, wherein
2 the flow rate of the rinse fluid is between 500~30000
3 ml/min.

1 12. The apparatus as claimed in claim 8, further
2 comprising a rear rinse line disposed behind the wafer
3 and in a position closer to the wafer center than the

4 rear suppressive nozzle to provide rinse fluid for
5 cleaning the rear wafer surface.

1 13. The apparatus as claimed in claim 12, wherein
2 the flow rate of the rinse fluid is between 500-30000
3 ml/min.

1 14. A method for removing metal from a wafer edge,
2 comprising the steps of:

3 providing a wafer with a metal layer at least
4 covering the edge thereof;

5 vertically immersing a predetermined portion of the
6 wafer into a chemical bath for etching the
7 metal layer; and

8 rotating the wafer to remove the metal layer of the
9 predetermined portion from the surface and the
10 edge thereof.

1 15. The method as claimed in claim 14, wherein the
2 predetermined portion is about 1-5 mm from the wafer
3 edge.

1 16. The method as claimed in claim 14, further
2 comprising the step of providing a front suppression flow
3 to the surface of the chemical bath near the front wafer
4 surface during the wafer edge metal removal to suppress
5 the chemical bath from splashing a portion of the wafer.

1 17. The method as claimed in claim 16, wherein the
2 front suppression flow is provided by a front suppression
3 line disposed in front of the front wafer surface.

1 18. The method as claimed in claim 16, wherein the
2 front suppression flow comprises an inert gas.

1 19. The method as claimed in claim 14, further
2 comprising the step of providing a front rinse flow for
3 cleaning the front wafer surface subsequent to the wafer
4 edge metal removal.

1 20. The method as claimed in claim 19, wherein the
2 front rinse flow is provided by a front rinse line
3 disposed in front of the wafer.

1 21. The method as claimed in claim 16, further
2 comprising the step of providing a rinse fluid to the
3 front wafer surface for cleaning the rear wafer surface
4 subsequent to the wafer edge metal removal.

1 22. The method as claimed in claim 16, wherein the
2 front rinse flow is provided by a front rinse line
3 disposed in front of the wafer and in a position closer
4 to the wafer center than the front suppression line.

1 23. The method as claimed in claim 14, wherein the
2 wafer is rotated at a speed between 5 to 300 rpm by a
3 rotatable wafer chuck.

1 24. The method as claimed in claim 14, wherein the
2 metal layer is a copper layer.

3 25. The method as claimed in claim 24, wherein the
4 chemical bath comprises a solution of sulfuric acid, H_2O_2
5 and DI water.

1 26. The method as claimed in claim 14, which is
2 performed using the apparatus of claim 1, comprising the
3 steps of:

4 disposing the wafer on the rotatable wafer chuck;

5 vertically immersing the wafer edge into the
6 chemical bath by moving the sliding element;

7 and

8 rotating the rotatable wafer chuck to remove the
9 metal layer at the wafer edge.